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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/532,304	03/22/2000	Yoshihiko Hirota	325772015800	8667

7590 05/24/2004  
Barry E. Bretschneider  
Morrison & Foerster LLP  
1650 Tysons Blvd., Suite 300  
McLean, VA 22102

EXAMINER

ROGERS, SCOTT A

ART UNIT PAPER NUMBER

2626

DATE MAILED: 05/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/532,304

**Applicant(s)**

HIROTA ET AL.

**Examiner**

Scott A Rogers

**Art Unit**

2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7,8 and 11 is/are allowed.
- 6) ☒ Claim(s) 2,4-6,9,10 and 12 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

***Response to Amendment***

Applicant's amendment and remarks filed 30 April 2004 have been considered. However, amended claims 2-6, 9, 10, and 12 cannot be allowed in view of the new ground(s) of rejection. The examiner regrets the indication of allowability of claims 2 and 4 in the prior Office Actions. The finality of the rejection in the last Office action is withdrawn. This is a non-final rejection.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 4, 9, 10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiau et al (US 5880857) in view of Rombola et al (US 6552824).

Referring to claims 2, 9, and 10:

Shiau et al disclose in the background art discussion, a known image processing unit and method in which input pixel data is successively quantized based on output values distributed at predetermined tone differences, an error of quantization of the pixel data is detected, the detected error of quantization of the pixel data with respect to an error of quantization of peripheral pixel data is integrated, and the integration error is feedback and added to pixel data input next (see col. 1, lines 26-53)

Shiau et al disclose the improvement of generating random noise in accordance with a tone level of the input pixel data and superimposing the generated random noise on the pixel data before the pixel data is quantized (see col. 3, line 57 to col. 4, line 17, and col. 6, lines 7-19).

Shiau et al do not disclose the quantization unit quantizing pixel data based on a plurality of reference levels so that tone reproduction data output has at least two tone levels.

However, from the same field of art, Rombola et al disclose quantizing pixel data based on a plurality of reference levels so that tone reproduction data output has at least two tone levels. This is described as the "multibit error diffusion" process in Rombola et al (see col. line 25-47, col. 4, lines 37-58, and col. 5, lines 1-32). Note also claims 9, 17, 22, and 26.

It would have been obvious to one of ordinary skill in the art to have modified the image processing unit Shiau et al, in view of the suggestion in Rombola et al, to have provided a selectable multibit error diffusion process in order to adapt to the quantization of pixel data based on image characteristics (e.g., lines, edges, highlights, etc.) and thereby improve the quality of image reproduction.

Referring to claim 4:

In Shiau et al, each of the pixel data has a tone level that inherently corresponds to an area.

Referring to claim 12:

Shiau et al disclose in the case of successive input of pixel data that comprise a plurality of color data necessary for color reproduction, and said random noise is generated for each color (see col. 9, lines 29-34).

Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiau et al and Rombola et al as applied to claim 2 above, and further in view of Tanioka et al (US 5153925).

Referring to claims 5-6:

Shiau et al do not disclose a simple quantizing unit that quantizes pixel data on which the random noise is not superimposed and a selector that selects either one of multilevel error diffusion processed pixel data and simple quantized pixel data in accordance with an attribute of the pixel data such as a character edge, and outputs the selected data as tone reproduction data.

However, from the same field of art, Tanioka et al teach a simple quantizing unit 201 that quantizes pixel data and a selector 202 that selects either one of error diffusion processed pixel data unit 200 and simple quantized pixel data from unit 201 in accordance with an attribute of the pixel data such as a character edge, and outputs the selected data as tone reproduction data (col. 3, lines 15-38).

It would have been obvious to one of ordinary skill in the art to have modified the image processing unit from a combination of Shiau et al and Rombola et al, in view of the suggestion in Tanioka et al, to have included a simple quantizing unit that quantizes

pixel data on which the random noise is not superimposed and a selector that selects for output as tone reproduction data, either one of multilevel (multibit) error diffusion processed pixel data and simple quantized pixel data in accordance with image characteristics (e.g., lines, edges, highlights, etc.) . The motivation for such modification in view of Tanioka et al, would have been to further improve the quality of image reproduction by selecting a fixed thresholding (simple quantizing) in accordance with the presence of an edges or lines in the input data (col. 2, lines 3-15).

#### ***Allowable Subject Matter***

Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 7-8 and 11 are allowed because of the limitations that define the noise component in the claimed combination.

#### ***Other Prior Art***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Matsushiro (US 6201612) disclose a multi-level error diffusion processor that calculates an average value of the pixels in said block for which said multi-level quantization process is selected, modifies said average value according to said block

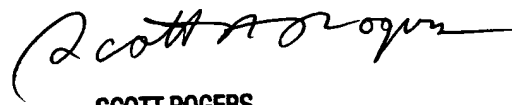
quantization errors in neighboring blocks processed preciously, then compares the modified average value with a plurality of threshold values.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A Rogers whose telephone number is 703-305-4726. The examiner can normally be reached on Monday-Thursday 6:00am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly Williams can be reached on 305-4863.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to Customer Service at 703-306-0377. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
SCOTT ROGERS  
PRIMARY EXAMINER

19 May 2004